



2024 RLI Impact in Leadership Award

Archie R. McGowan, MD, MBA, FACR
Co-Director Portsmouth Regional Hospital Comprehensive Stroke Center
Portsmouth Regional Hospital

Project Description

From my first clinical exposure to the morbidity and disability caused by ischemic stroke, I became interested in the diagnosis, treatment, and prevention of acute ischemic stroke (AIS). Thankfully, over the course of my career all three elements have undergone a rapid period of scientific and clinical advancement. However, medical care has historically been delivered locally and this creates challenges and limitations in providing quick effective care in less geographically dense regions like my practice, Atlantic Radiology of New Hampshire, in Northern New England. The structural, economic, and technical challenges within our healthcare system are additional complications to the delivery of care.

After early supportive clinical trials in 2008 and the three positive stroke intervention trials of 2015 the community needs for AIS care in New Hampshire required that this care be available. The initial stated goal of our team was “providing necessary AIS care to a population that would otherwise have limited access.” The actual goal was decreasing the morbidity and mortality of AIS and this is highly dependent on early competent coordinated intervention. Ischemic stroke care shares these requirements with acute coronary syndromes, trauma and to a lesser degree hemorrhagic stroke secondary to subarachnoid hemorrhage. Utilizing models of rapid coordinated care delivery is necessary.

According to the CDC, stroke is the number five cause of death in the US with 163,000 deaths per year in the US and a nationwide average of 49 deaths per 100,000 people per year. 795,000 strokes occur per year in the US with 87% being ischemic and approximately 20-25% of those being potentially treatable with interventional care. Northern New England has a relative low penetration of disease relative to other parts of the country with New Hampshire having a mortality rate of only 30.3 deaths per 100,000 per year which is good but further decreases the density of disease in our geographic area making subspecialty care even more challenging.

Starting in 2010 my private practice took the lead in Southern New Hampshire offering subspecialty dedicated interventional radiology care in our 220-bed facility as well as referral from five other local facilities which were without dedicated interventional services. These services included trauma, stroke, vascular embolization, GI work, urologic work, women's health, pain and interventional oncology. The provision of the services was asymmetrically burdensome on the IR members of the private practice and considered by some partners to be disruptive, divisive and economically unwise. Nonetheless, the clinical benefit to patients and the community was clear and the economic benefit to the hospital also clear.

Solving or minimizing the problem of asymmetric professional burden and the disconnect between the benefit to the group and the hospital was obviously complex and required far more than the ability to perform a thrombectomy. All signs pointed to "managing" the integration of the related pieces to solve the delivery



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puzzle. At the same time the **Radiology Leadership Institute** was developing courses on how to address the non-clinical functions leaders needed to perform in order to provide care and help their practices succeed.

Specifically, topics at the 2017 summit became highly relevant. Scott Taylor's symposia on sustainable change outlined the steps of aligning incentives for the decision makers in way that was more broadly applicable and allowed a redefinition of the "asks" necessary to acquire resource for clinical support and was relevant to our organization working with a for profit hospital. Using this methodology, we were able to reframe the request. Instead of asking for call pay and a biplane we asked to be partners in a new service line. The topics addressed in the "customer insight" sessions clearly allowed one to consider the proposal/request for hospital financial and clinical capital spending to be considered from the perspective of return on investment and other metrics known to the C suite team but not in the radiology vernacular. This perspective aided in our team's ability to listen and ultimately was the key to the project's success.

Six Sigma/Lean discussions were championed by the RLI and have been utilized by Atlantic Radiology of New Hampshire to circle back and constantly try to improve our delivery of care. Early in the project thrombectomy post case debriefs were performed on every case with an eye towards process improvement and timeliness of care. Morbidity and mortality reviews are part of our process and have aided in learning of potential pitfalls, allowed us to track various manageable metrics as well as celebrate a high TICI 3 success rate.

Starting around 2018 the clinical and administrative teams felt that we were collectively ready to move forward with creating a certified comprehensive stroke center to augment care and address hemorrhagic stroke, subarachnoid hemorrhage, arterial venous malformation and incidental aneurysms in our community. However, the demographics of these diseases were not dense enough for a project to be economically viable for our private practice group. This was a critical point where the RLI tools came into play. Using the RLI toolbox our team was able to develop a relationship with University of Massachusetts aneurysm center on the professional side to provide this type of NIR care separately but within our financial structure. The synergy here was based on the density of disease and the timeliness of intervention. This was possible in part due to the timeline for treatment of subarachnoid which is typically more elongated from diagnosis to therapy than AIS. For subarachnoid hemorrhage early intervention is defined as within 72 hours. Our team delivers care within 24 hours and often sooner. With this model the NIR aneurysm team can be safely based 90 minutes away in Worcester, Massachusetts while the AIS team is onsite within 20 minutes. While the economics of the NIR professional costs could not be sustained by subsidy from Atlantic Radiology's professional income stream they could be supported by the hospital due to the favorable hospital economics of the NIR care.

The combined teams of our certified comprehensive center are now in our fourth year of operation. In our unique model I have served as the co-director on the ischemic side and my partner from University of Massachusetts Ajit Puri, has been the co-director on the ischemic side. Our volumes are growing, our TICI2b and TICI3 outcomes as well as our disability/Rankin score metrics are well above average, and it is now time to evaluate the next steps in widening the care.

I see several opportunities to build on our solid foundation. Personally, I am interested in trying to reach the next level of care delivery by reducing the geographic burden in therapy the way the previous generation of



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advancements reduced the role of geography in diagnosis. I am now serving as a consultant for Telos, a stroke robot company to ultimately provide remote stroke therapy in rural areas such as Northern New England and anywhere the population cannot support the needed level of sub specialization.

Restructuring is in the works to organize the regional systems of stroke care. Using the RLI framework, the improved voice of my group has successfully petitioned the state of New Hampshire to improve acute stroke and Interventional Radiology care. During COVID when there was little revenue, I was able to get New Hampshire Governor Chris Sununu to provide a grant of \$50,000 to support our clinical AIS and IR services. Additionally, a program is now being developed for improved EMS facility selection based clinical findings predicting likely LVO presence.

Our hospital CEO is also currently restructuring his side as well and looking towards regionalization of care with ambulance services/transport augmentation, a dedicated helicopter service, collaborative relationships with other facilities and off-site emergency rooms.

Technical innovations have removed the geographic component to diagnostic imaging. But geography remains a formidable foe on the therapeutic intervention side. This is where we will continue to use the RLI toolbox of management skills to support patient care and the sustainability of our group.